

APPLICANT(S): AVNI, Dror et al.
SERIAL NO.: 09/730,586
FILED: December 7, 2000
Page 2

Bl
emo
programming pulses are correlated to the difference between a present state of the one or more memory cells and a target state of the one or more memory cells.

Attached hereto is a marked-up version of the changes made by current amendment. The attached pages are captioned "Version with Markings to Show Changes Made".

Kindly consider the following remarks:

REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims 1 to 14 are pending in the application. Claims 1 to 14 have been rejected. Claim 1 has been amended to clarify the claims. Claims 15 to 22, which were not elected in response to the Examiner's previous restriction requirement, have been canceled.

Applicants respectfully assert that the amendments to the claims are of an editorial nature and add no new matter. More specifically support for the newly added text in amended claim 1 may be found on page 34, line 11, on page 35, line 20 and on page 36 line 11 of the specification.

CLAIM REJECTIONS

35 U.S.C. § 102 Rejections

In the Office Action, the Examiner rejected claims 1 to 14 under 35 U.S.C. § 102(a), as being anticipated by U.S. Pat. No. 6,292,394 to Cohen et al. The Examiner also rejected

APPLICANT(S): AVNI, Dror et al.
SERIAL NO.: 09/730,586
FILED: December 7, 2000
Page 3

claims 1 to 14 under 35 U.S.C. § 102(b), as being anticipated by U.S. Pat. No. 5,870,335 to Khan et al. Applicants respectfully disagree with these rejections. More specifically:

Amended Independent claim 1 now recites "A method for programming a memory array... comprising... adapting the duration or the amplitude of said programming pulses as a function of the difference between a present state of the one or more memory cells and a target state of the one or more memory cells, wherein the amplitude or duration of the programming pulses are correlated to the difference between a present state of the one or more memory cells and a target state of the one or more memory cells."

Whereas, The Cohen reference teaches:

"A method for programming an array having a multiplicity of memory cells. The method includes, per cell to be programmed, verifying a programmed or non-programmed state of the cell and flagging those of the cells that verify as non-programmed during one of the verify steps after having previously verified as programmed. A programming pulse having a programming level is applied to the non-programmed cells which are not flagged cells. The steps of verifying, flagging and applying are then repeated until all of the cells verify as programmed at least once. Subsequently, a boost pulse having a boost programming level lower than the programming level is applied to the flagged cells." (Cohen reference Abstract)

And, Whereas, The Kahn reference teaches:

"An integrated circuit memory system and method for precision hot carrier injection programming of single or plurality of nonvolatile memory cells is described. Each program cycle is followed by a verify cycle. Precision programming is achieved by incrementally changing a programming current pulse flowing between the source and drain in the memory cell during successive program cycles and a constant current during successive verify cycles. Current control and voltage mode sensing circuitry reduces circuit complexity, reduces programming cell current, lowers power dissipation, and enables page mode operation. Precision programming is useful for multilevel digital and analog information storage." (Kahn reference Abstract)

Neither the Cohen nor the Kahn references teach or suggest "adapting the duration or the amplitude of said programming pulses as a function of the difference between a present state of the one or more memory cells and a target state of the one or more memory cells." To the contrary, the programming pulse voltage levels and durations in the two references are

APPLICANT(S): AVNI, Dror et al.
SERIAL NO.: 09/730,586
FILED: December 7, 2000
Page 4

predefined, fixed and not adapted based on the current state of the cells being programmed. The cited references teach verifying a program attempt and then repeating a programming pulse with the same amplitude and same duration, if programming attempt did not result in a successful programming of the cell. There is no mention or suggestion of adapting the amplitude of the programming pulses or changing their duration. Applicants, therefore, respectfully request reconsideration and withdrawal of the rejections of independent claim 1. Since claims 2 through 14 depend from claim 1, Applicants believe claims 2 to 14 to be allowable by virtue of their dependence on an allowable base claim.

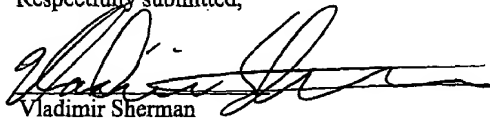
Applicants note that none of the amendments to the claims herein are in response to the above discussed prior art rejections. The amendments were made in an attempt to further clarify claims and to expedite prosecution.

In view of the foregoing amendments and remarks, all pending claims are believed to be allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 05-0649.

Respectfully submitted,



Vladimir Sherman
Attorney for Applicant(s)
Registration No. 43,116

Dated: June 12, 2003

Eitan, Pearl, Latzer & Cohen-Zedek
One Crystal Park, Suite 210, 2011 Crystal Drive
Arlington, VA, USA 22202-3709
Telephone: (703) 486-0600
Fax: (703) 486-0800

APPLICANT(S): AVNI, Dror et al.
SERIAL NO.: 09/730,586
FILED: December 7, 2000
Page 5

Version with Markings to Show Changes Made

In the Claims:

1. A method for programming a memory array, the method using programming pulses applied to either the drain or gate of one or more memory cells within said memory array, the method comprising:

adapting the duration or the amplitude of said programming pulses as a function of the difference between a present state of the one or more memory cells and a target state of the one or more memory cells, wherein the amplitude or duration of the programming pulses are correlated to the difference between a present state of the one or more memory cells and a target state of the one or more memory cells.[current state of said memory array].